the formation of cracks in a surface layer without the occurrence of blisters in a back fiber-reinforced plastic layer. Moreover, another object of the present invention is to provide a production method of the above molded article.

As a result of conducting earnest studies on the above problems, the inventors of the present invention found that the above problems can be solved by providing a cured intermediate layer between the surface layer and fiber-reinforced plastic layer of a molded article using a specific composition comprising a curable resin composition including a polymerizable unsaturated monomer and polymerization curable unsaturated resin, a filler, and a thixotropic agent, thereby leading to completion of the present invention.

Namely, the present invention provides a fiber-reinforced plastic molded article including a surface layer (A) containing a polymer material, an intermediate layer (B), and a fiber-reinforced plastic layer (C), wherein (1) said intermediate layer (B) is composed of a cured product of an intermediate layer composition comprising a curable resin composition including a polymerizable unsaturated monomer and a polymerization curable unsaturated resin, a filler, and a thixotropic agent, (2) said curable resin composition is able to form a casting plate having a tensile elongation percentage of 2 to 50% and a Barcol hardness (B value) of 50 or more by its curing, (3) the content of said filler is 30 to 150 parts by weight relative to 100 parts by weight of the curable resin composition, and (4) the content of said thixotropic agent is 1 to 4 parts by weight relative to 100 parts by weight of the curable resin composition.

The filler may contain a hollow filler having a mean particle size of 5 to 200 μm. The curable resin composition may have a gelation time of 10 to 30 minutes and a viscosity of 20 to 40 poise. Alternatively, the curable resin composition may have a gelation time of 3 to 8 minutes a viscosity of more than 40 but no more than 100 poise. The polymerization curable unsaturated resin may be at least one type selected from a group including epoxy(meth)acrylate resin, urethane(meth)acrylate resin, and unsaturated polyester.

The curable resin composition is preferably able to form a casting plate having a tensile elongation percentage of 3 to 10% and a Barcol hardness (B value) of 50 to 95 by its curing. Alternatively, the curable resin composition is preferably able to form a casting plate having a Heat Deflection temperature of 60°C or more, a tensile strength of 10 MPa or more, and a Barcol hardness (A value) of 30 or more.

The filler may be calcium carbonate powder. The surface layer (A) may be composed of a cured product of a gelcoat resin.

Moreover, the present invention provides a molding mold equipped with the aforementioned fiber-reinforced plastic molded article.

Moreover, the present invention provides a method of producing a fiber-reinforced plastic molded article comprising (1) forming a surface layer (A) with a gelcoat resin on a mold inner surface, (2) spraying an intermediate layer composition onto said surface layer (A) followed by curing to form an intermediate layer (B), and (3) curing a fiber-reinforced plastic layer composition including a fiber reinforcing material and a curable resin composition containing a polymerizable unsaturated monomer and a polymerization curable unsaturated resin on said intermediate layer (B) to form a fiber-reinforced plastic layer (C), wherein said intermediate layer composition includes a curable resin composition containing a polymerizable unsaturated monomer and a polymerization curable unsaturated resin, a filler, and a thixotropic agent, said curable resin composition is able to form a casting plate having a tensile elongation percentage of 2 to 50% and a Barcol hardness (B value) of 50 or more by its curing, the content of said filler is 30 to 150 parts by weight relative to 100 parts by weight of said curable resin composition, and the content of said thixotropic agent is 1 to 4 parts by weight relative to 100 parts by weight of said curable resin composition.

DETAILED DESCRIPTION OF THE INVENTION

Prior to providing a detailed explanation of the present invention, the following provides an explanation regarding the definition of technical terms used in the present invention.

Casting Plate

The technical term, casting plate, refers to a casting plate fabricated according to the following method in compliance with "5.2.3 Production of Test Pieces" in Japanese Industrial Standard JIS-K6919.

(1) Two glass plates that have been treated with wax or another mold release agent and have satisfactory smoothness were made available.

(2) A U-shaped spacer having a thickness of 3.0±0.2 mm was clamped between the

glass plates to fabricate a casting mold in which the spacer and glass plates are closely adhered without any gaps in between.

(3) After vacuum degassing a curable resin composition including a polymerizable unsaturated monomer and a polymerization curable unsaturated resin into which a curing accelerator and curing agent have been blended, said resin composition was poured into the opening of the casting mold and allowed to stand at normal temperature until generation of the heat of curing is completed.

(4) After after-curing said casting mold for 2 hours at 120°C, the casting mold was removed at normal temperature to obtain a casting plate.

Tensile Elongation Percentage

The technical term, tensile elongation percentage, refers to the tensile elongation percentage measured according to the following method in compliance with "Tensile Test Methods" in Japanese Industrial Standard JIS-K-7113.

(1) Production of Test Piece

A short piece measuring 175 mm x (20±0.5) mm x 3 mm was cut out of the above casting plate to produce a dumbbell-shaped test piece provided with a parallel portion having a width of 10±0.5 mm in its central portion for 60±0.5 mm in the lengthwise direction. At this time, the width reduction from the 20 mm width of the original short piece to 10 mm has a curvature of a radius of 60 mm. After cutting a test piece to the above shape, the ends of said test piece were sanded with #400 to #800 sandpaper.

(2) Test Method

The thickness and width of the parallel portion of the above test piece were measured with a micrometer. An extensometer having a distance between reticules of 50 mm was placed on the parallel portion of the above test piece, locations 30 mm from both ends of the test piece were clamped with a test jig and stretched at the rate of 5 mm/min. The value obtained by dividing the maximum load at this time by the surface area of the parallel portion was taken to be the "tensile strength", and the degree of the elongation at the time of rupture was taken to be the "tensile elongation percentage".

Barcol Hardness

The technical term, Barcol hardness, refers to the Barcol hardness measured